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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/055,448	01/23/2002	Wayne A. Bonin	S01.12-0827	6393

7590

05/06/2004

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EXAMINER

WONG, KIN C

ART UNIT	PAPER NUMBER
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2651

DATE MAILED: 05/06/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/055,448

Applicant(s)

BONIN ET AL.

Examiner

K. Wong

Art Unit

2651

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 10 November 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-18 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-18 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 23 January 2002 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 2&3.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims (1-18) are rejected under 35 U.S.C. 103(a) as being unpatentable over Pohl et al (4853810) in view of Kakekado et al (6359746).

Regarding claims 9 and 17: Pohl et al discloses a disc drive (as depicted in figure 1 and see associated descriptions for details), including:

a disc (element 3 in figure 1) that includes a media surface (element 16 in figure 2 of Pohl et al);

a slider (see col. 8, lines 5156 of Pohl et al) that includes a read/write head that is spaced apart from the media surface by a fly height spacing (see col. 4, lines 6-23 of Pohl et al);

a sensor (as depicted in figures 10-14 of Pohl et al) comprising an electrode tip disposed on the slider and facing a first portion of the media surface across a gap, the sensor being adapted to conduct an electric current through the gap and to provide a sensor electrical output representative of the length of the gap (see col. 5, line 20 to col. 8, line 11 of Pohl et al);

actuator (see col. 3, line 55 to col. 4, line 3 of Pohl et al) adjusting the fly height spacing as a function of a received actuator electrical input; and

a feedback circuit (as depicted in figures 13 -14 and see associated descriptions for details) providing the actuator electrical input as a feedback function of the sensor electrical output to control the fly height spacing.

Although Pohl et al discloses the actuator for controlling the fly height spacing, Pohl et al fails to mention a capacitive (an electrostatic actuator – in accordance with the instant specification page 14, line 8-11) actuator for controlling or adjusting the fly height in response to the detected head/disk spacing. Kakekado et al is relied on for the teachings of capacitive actuator adjusting the fly height in response to detected head/disk spacing (see col. 7, lines 17-63 of Kakekado et al).

It would have been obvious to one of ordinary skill in the art at the time of the invention was made to modify the actuator of Pohl et al with an electrostatic actuator as taught by Kakekado et al. The rationale is as follows: one of ordinary skill in the art would have been motivated to provide an actuator that enable for the head to fly low 100 nm the head/disk spacing as suggested in col. 5, lines 16-20 of Kakekado et al.

Regarding claim 10: Pohl et al teaches that wherein the electrode tip has a tip surface adapted to provide quantum mechanical field emission current through the gap (in col. 5, line 20 to col. 6, line 46 of Pohl et al).

Regarding claim 11: Pohl et al teaches that wherein the gap is in a range of 5 to 15 nanometers (in col. 4, lines 51-60 and col. 9, line 2 to col. 10, line 21 of Pohl et al).

Regarding claim 12: the limitations of wherein the tip has a tip surface comprising material selected from the group: p-doped diamond and diamond like carbon (DLC), tungsten, molybdenum, lanthanum hexaboride, silica particles and beryllia particles are

considered known surface coating material for the slider (see col. 6, line 4 of Pohl et al and col. 8, lines 1-2 of Kakekado et al).

Regarding claim 13: Pohl et al teaches that wherein the electrode tip is part of a layer of material in the read/write head (in col. 4, lines 7-11 of Pohl et al).

Regarding claims 14 and 18: the limitations of wherein the capacitive actuator is mechanically coupled to the electrode tip are considered known because Pohl et al disclosed the electrode tip is an integral of the slide which is mechanically coupled to actuator. Thus, the combination of Pohl et al and Kakekado et al will includes the capacitive (electrostatic) actuator and electrode tip. Therefore, the limitations of the capacitive actuator mechanically coupled with the electrode tip are satisfied.

Regarding claim 15: the limitations of wherein the capacitive actuator comprises a first capacitive electrode surface that is disposed on the slider and that faces a second portion of the media surface that forms a second capacitive electrode are known in the combination of Pohl et al and Kakekado et al (see depictions of figures 8-10 of Kakekado et al).

Regarding claim 16: the limitations of the spacing of the first capacitive electrode surface is spaced apart from the second capacitive electrode by a capacitor spacing that is greater than the gap spacing are considered known because Pohl et al describes the spacing of gap and head/disk spacing in col. 4, lines 51-60 which in the combination of Pohl et al and Kakekado et al would yield the known capacitor (electrostatic) spacing gap and head/disk spacing gap.

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Regarding claims 1-8: method claims (1-8) are drawn to the method of using the corresponding apparatus claimed in claims 9-16. Therefore method claims (1-8) correspond to apparatus claims (9-16) and are rejected for the same reasons of obviousness as used above.

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Kobayashi (JP02002312967A) and Koshikawa et al (5920978) are cited for capacitive actuator. Church et al (3944683) is cited for surface coating.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to K. Wong whose telephone number is (703) 305-7772.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Dave Hudspeth can be reached on (703) 308-4825. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

akw

26 Apr 04



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